# EXHIBIT II

# MARS VERY DEEP DRILL REQUIREMENTS

Since science is the driver for the robotic Mars Exploration Program and since the focus of the early Very Deep Drill Missions is assumed here to be exploration, rather than resource production, the primary objectives for the drill relate to 1) achieving depth and 2) allowing science instruments to investigate subsurface material being accessed, along with contextual information. Together, these will allow missions to pursue some of the MEP objectives summarized in Exhibit I.

Very Deep Drilling Baseline Requirements

- Drill to depths of 100 m, 300 m and 1 km.
    - These three depths are representative of likely objectives for different mission options
    - Heritage from one mission to the next is desirable to reduce overall cost and risk. It is important to communicate where there are advantageous design breakpoints, requiring new approaches (and why).
- Bring subsurface samples to the surface for in situ analysis.
    - Assume that at least 100 core samples are required to be brought to the surface. The system should be capable of returning these samples from the full drilling range. Assume that the minimum core diameter is 1 cm and the minimum core length 10 cm.
- Provide contextual information (e.g., depth) along with each sample
- Allow for one or more instruments to go downhole
    - A primary example would be an ice and water detector
    - Support measurement-while-drilling, downhole-logging, or both

Desired Increases above the Baseline

- Continuous coring.

  and/or
- Delivery of water from deep reservoir to the surface.

Potential Decreases to the Baseline

- No core samples, fragments/cuttings only.

The Program desires an understanding of the trades (cost, risk, etc.) associated with meeting increases or decreases to the baseline requirements.